UNITED STATES PATENT AND TRADEMARK OFFICE

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10/814,475	03/30/2004	Hiroshi Suzuki	16869N-111600US	7769

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2185	

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _23 August 2006_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-20_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _3/30/04_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

       1.☒ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August

23, 2006 has been entered. Per the amendment, Claims 1, 2, 9, 11 and 15 have been

amended.

2.   The instant application having Application No. 10/814,475 has a total of 20

claims pending in the application; there are 5 independent claims and 15 dependent

claims, all of which are ready for examination by the examiner.

I. RESPONSE TO AMENDMENT(S) / ARGUMENT(S)

3.   Applicant's arguments with respect to the disclosures of Hubis and McIlroy have

been fully considered, but are moot in view of the new ground(s) of rejection, as

described below.

IV. REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections - 35 USC ' 112

4.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

5.   **Claims 16-19** are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

6.   Claims 16-19 recite the limitation *"said connected state value".* There is

insufficient antecedent basis for this limitation in the claims. For the purposes of further

examination, the Examiner will read the claims as reciting *"a connected state value".*

VII. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC ' 102 - Hubis

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.   **Claims 1-4, 6, 9-11 and 15** are rejected under 35 U.S.C. 102(b) as being

anticipated by <u>Hubis</u> et al. *(US Patent Number 6,343,324).*

9.   As per **Claim 1**, <u>Hubis</u> discloses an input/output management system for

managing input or output from or to a disk device *(Hubis, disk drive storage array,*

column 3 lines 62-65) connected to a computer *(host 1, Figure 2A),* comprising:

        a connection information definition block *(NURAM 182, Figure 2A)* in

    which the relationship of logical connection *(port mapping table entry 190, Figure*

    2B-3) between said computer and a logical volume *(logical volume, column 10*

    line 33) included in said disk device or a logical area *(logical volume, column 10*

line 33) in a logical volume *(physical disc drive, column 10 line 32)* is defined;

and

an input/output execution control block *(processor 180, Figure 2A)* that

controls, based on the definition, whether said computer can access a logical

volume included in said disk device or a logical area in a logical volume *(column*

4 lines 6-8).

The Examiner notes that though Hubis discloses both limitations *"a logical*

volume included in said disk device" and *"a logical area in a logical volume"*, Hubis need

only disclose one to serve as a valid rejection.

10.   As per **Claim 2,** Hubis discloses an input/output management system for

managing input or output from or to a disk device *(disk drive storage array, column 3*

lines 62-65) connected to a plurality of computers *(plurality of computers, column 4 line*

3 and host 1 through M, Figure 2A), comprising:

a connection information definition block *(NURAM 182, Figure 2A)* in

which the relationship of logical connection *(port mapping table 190, Figure 2A)*

between each of said computers and a logical volume *(storage volume 108,*

column 4 line 48 and logical volume 1, Figure 2A) included in said disk device or

a logical area *(logical volume, column 10 line 33)* in a logical volume *(physical*

disc drive, column 10 line 32) is defined using computer identification information

(unique identifier, column 4 line 5); and

an input/output execution control block *(processor 180, Figure 2A)* that

controls, based on the definition, whether each of said computers can access a

logical volume included in said disk device or a logical area in a logical volume

(column 4 lines 6-8).

11.   As per **Claim 3**, <u>Hubis</u> discloses an input/output management system according

to Claim 1, wherein said connection information definition block comprises:

a computer identification information definition division *(host computer ID*

map data structure, column 4 lines 10-11) in which physical identification

information *(host computer ID, column 4 line 10)* that uniquely indicates said

computer connected to said disk device is defined.

12.   As per **Claim 4**, <u>Hubis</u> discloses an input/output management system for

managing input or output from or to a disk device connected to a computer according to

Claim 1, wherein said connection information definition block comprises:

a computer identification information definition division *(port mapping table*

190, Figure 2B-3) in which the relationship of logical connection *(port mapping*

table entry 191, Figure 2B-3) between said computer and a logical area in a

logical volume included in said disk device is defined using computer

identification information *(host index 151, Figure 2B-3)*.

13.   As per **Claim 6**, <u>Hubis</u> discloses an input/output management system according

to Claim 1, wherein said connection information definition block comprises:

a computer identification information definition division *(port mapping table*

190, Figure 2B-3) in which the relationship of logical connection *(port mapping*

table entry 191, Figure 2B-3) between said computer and a logical volume

included in said disk device is defined using port numbers *(i/o processor number*

column in port mapping table, Figure 2B-3) assigned to the ports of said disk

device connected to said computer *(port 114-1 through port 114-M in Figure 2A)*.

14.   As per **Claim 9**, <u>Hubis</u> discloses an input/output management method for

managing input or output from or to a disk device (disk drive storage array, column 3

lines 62-65) connected to a computer (host 1, Figure 2A), comprising the steps of:

defining the relationship of logical connection *(NURAM data structures*

182, Figure 2A) between said computer and a logical volume *(logical volume,*

column 10 line 33) included in said disk device or a logical area *(logical volume,*

column 10 line 33) in a logical volume *(physical disc drive, column 10 line 32)*;

and controlling, based on the definition, whether said computer can

access a logical volume included in said disk device or a logical area a logical

volume *(column 4 lines 6-8)*.

15.   As per **Claim 10**, <u>Hubis</u> discloses an input/output management method

according to Claim 9, wherein

the definition of the relationship of connection contains physical

identification information *(host world wide name list 153, Figure 2B-1)* that

uniquely indicates said computer connected to said disk device.

16.   As per **Claim 11**, <u>Hubis</u> discloses an input/output management method for

managing input or output from or to a disk device (disk drive storage array, column 3

lines 62-65) connected to a computer (host 1, Figure 2A), comprising the steps of:

defining, based on computer identification information *(host world wide*

name list 153, Figure 2B-1) and logical volume connection information *(volume*

permission table 194, Figure 2B-3), the relationship of logical connection *(port mapping table 190, Figure 2B-3)* between said computer and a logical volume *(logical volume, column 10 line 33)* included in said disk device or a logical area *(logical volume, column 10 line 33)* in a logical volume *(physical disc drive, column 10 line 32)*; and

controlling, based on the definition, whether said computer can access a logical area in a logical volume included in said disk device *(column 4 lines 6-8)*.

17.   As per **Claim 15**, <u>Hubis</u> discloses a disk control program for implementing a method of processing information based on which input or output from or to a disk device *(disk drive storage array, column 3 lines 62-65)* connected to a computer *(host 1, Figure 2A)* is managed, wherein said method comprises the steps of:

defining the relationship of logical connection *(NURAM data structures 182, Figure 2A)* between said computer and a logical volume *(logical volume, column 10 line 33)* included in said disk device or a logical area *(logical volume, column 10 line 33)* in a logical volume *(physical disc drive, column 10 line 32)* on the basis of both physical identification information *(host world wide name list 153, Figure 2B-1)* that uniquely indicates said computer connected to said disk device, and logical volume connection information *(permission column 195, Figure 2B-3)* that contains a connected state value *(permission value 195, Figure 2B-3)* concerning the connection of said computer to each logical volume included in said disk device or each logical area in each logical volume; and

controlling, based on the definition, whether said computer can access a

logical volume included in said disk device or a logical area a logical volume

(column 4 lines 6-8).

18.   As per **Claims 16-20**, but more specifically to <u>Claim 16</u>, <u>Hubis</u> discloses an

input/output management system according to <u>Claim 1</u>, wherein if said connected state

value *(permission value 195, Figure 2B-3)* is an intermediate value *(the permission*

value is a flag, and therefore does not have an intermediate value), then:

(The Examiner notes that the structure of the claim is such that if the connected

state value is NOT an intermediate value then there is no further limitation to the

claimed subject material. As Hubis' permission value does not have an intermediate

value, the rest of the claim accordingly is not given patentable weight.)

If an access key is not appended to an input/output request issued by said

computer, said computer is treated as fully disconnected;

If an access key is appended to an input/output request issued by said

computer and if said access key is larger than said connected state value,

input/output for said input/output request is disabled; and

If an access key is appended to an input/output request issued by said

computer and if said access key is equal to or smaller than said connected state

value, input/output for said input/output request is enabled.

Claim Rejections - 35 USC ' 103 – Hubis and King

19.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

20.   **Claim 5, 7 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable

over Hubis et al *(US Patent Number 6,343,324)* in view of King et al *("Operating System*

Support for Virtual Machines").

21.   As per **Claim 5**, Hubis discloses an input/output management system according

to Claim 4, wherein

computer identification information *(host index 151, Figure 2B-3)*

concerning said computer is specified in said computer identification information

definition division *(port mapping table 190, Figure 2B-3)*, and

said input/output execution control block controls whether said computer

can access a logical area in a logical volume included in said disk device *(column*

4 lines 6-8).

Hubis does not disclose said computer including a plurality of logical computers,

wherein computer identification information concerning each of said logical computers is

specified in said computer identification information definition division, and said

input/output execution control block controls whether each of said logical computers that

share the same physical input/output path can access a logical area in a logical volume

included in said disk device.

King discloses a computer *(computer system, section 1 paragraph 1 lines 2-3)* including a plurality of logical computers *(virtual machines, section 1 paragraph 2 lines 5-6),*

wherein computer identification information concerning each of said logical computers *(host index 151, Figure 2B-3, see interpretation below)* is specified in said computer identification information definition division, and

said input/output execution control block controls whether each of said logical computers that share the same physical input/output path can access a logical area in a logical volume included in said disk device *(King, figure "Type I VMM", see interpretation below).*

The virtual machines run inside the client computer *(King, figure "Type I VMM")* and as said client computer's access over its physical input/output path is controlled by the input/output execution control block, inherently so would the virtual machines. Additionally, the computer identification associated with each of said logical computers *(host index 151, Figure 2B-3)* is identical and is specified in said computer identification information definition division.

King and Hubis are analogous art in that they both deal with systems of multiple and heterogeneous host computers. It would have been obvious to someone with ordinary skill in the art to run the plurality of virtual machines taught by King on the client computer in Hubis' input/output management system.

King states that virtual machines can be used to provide a software environment for debugging operating systems that is more convenient than using a physical machine

(section 1 paragraph 2 line 13-15) and provide a convenient interface for adding

functionality *(section 1 paragraph 2 line 15-19)*.

Therefore, it would have been obvious to combine the host taught by Hubis with

the virtual machines taught by King for the benefit of debugging and conveniently

adding functionality, to obtain the invention as specified in claim 5.

22.   As per **Claim 7**, Hubis and King disclose an input/output management system for

managing input or output from or to a disk device connected to a computer according to

Claim 1,

> wherein the definition *(Hubis, port mapping table 190, Figure 2B-3)* is used
>
> to control whether each of application programs running in said computer *(King,*
>
> *guest applications, figure "Type I VMM")* can access a logical volume included in
>
> said disk device or a logical area in a logical volume *(Hubis, column 4 lines 6-8)*.

King discloses multiple applications running in a virtual machine *(guest*

applications, figure "Type I VMM"). The virtual machines run inside the client computer

(King, figure "Type I VMM") and as said client computer's access over its physical

input/output path is controlled by the input/output execution control block, inherently so

would the virtual machines.

23.   As per **Claim 12**, Hubis and King disclose an input/output management method

according to Claim 9,

> wherein whether each of a plurality of application programs running in said
>
> computer *(King, guest applications, figure "Type I VMM")* can access a logical

volume included in said disk device or a logical area in a logical volume is

controlled *(Hubis, column 4 lines 6-8)*.

Claim Rejections - 35 USC '103 – Hubis and Tang

24.   **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over <u>Hubis</u> et

al *(US Patent Number 6,343,324)* in view of <u>Tang</u> et al *("Load Distribution via Static*

Scheduling and Client Redirection for Replicated Web Servers").

25.   As per **Claim 13**, <u>Hubis</u> discloses an input/output management method

according to Claim 11, wherein a plurality of pieces of definition information *(port*

mapping table entry 191, Figure 2B-3) define whether said computer or each of a

plurality of application programs running in said computer can access a logical volume

included in said disk device or a logical area in a logical volume *(column 4 lines 6-8)*.

Hubis does not disclose the plurality as being automatically switched with the start of

each of time zones according to a predefined schedule.

The limitation *"said computer or each of application programs running in said*

computer" can be fulfilled by one or more of the limitations *"said computer"* or *"each of a*

plurality of application programs running in said computer".

Tang discloses a plurality of pieces of definition information as being

automatically switched *(section 2 item 2 lines 3-5)* with the start of each of time zones

(period of T$_s$, section 2 item 2 line 3) according to a predefined schedule *(section 2 item*

2).

Hubis and Tang are analogous art in that they deal with managing the connection

relationship between clients accessing data from one of a plurality of storage locations.

It would have been obvious to someone with ordinary skill in the art to schedule

connections in Hubis' storage system with Tang's scheduler.

Tang discloses that using a scheduler allows user-specific data to be migrated or

located at a specific storage location *(section 1 paragraph 3 lines 11-13)* while still

keeping the load on each storage location balanced *(section 1 paragraph 3 lines 13-14)*.

Therefore, it would have been obvious to combine the storage system taught by

Hubis with the scheduler taught by Tang for the benefit of minimizing data replication

and balancing the load on each storage location, to obtain the invention as specified in

Claim 13.

Though not required for the current rejection, the Examiner notes that as per the

rejection of Claim 7, King *("Operating System Support for Virtual Machines")* discloses a

computer *(computer system, section 1 paragraph 1 lines 2-3)* including a plurality of

applications *(guest applications, figure "Type I VMM")*.

Claim Rejections - 35 USC ' 103 – Hubis, King and Tang

26.   **Claims 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over <u>Hubis</u> et

al *(US Patent Number 6,343,324)* and <u>King</u> et al *("Operating System Support for Virtual*

Machines") as applied to Claim 7 above, and in further view of <u>Tang</u> et al *("Load*

Distribution via Static Scheduling and Client Redirection for Replicated Web Servers").

Hubis and King disclose an input/output management system according to Claim 7, wherein

a plurality of pieces of computer identification information *(Hubis, port mapping table entry 191, Figure 2B-3)* defining whether said computer or each of said application programs *(King, guest applications, figure "Type I VMM")* can access a logical volume included in said disk device or a logical area in a logical volume *(column 4 lines 6-8)*.

Hubis and King do not expressly disclose the system further comprising a schedule definition division containing said plurality of pieces of computer identification information being specified in relation to respective time zones, and in which a schedule for automatically changing the plurality of pieces of computer identification information is predefined.

Tang discloses a system comprising a schedule definition division containing a plurality of pieces of computer identification information *(hostname/IP address, section 2.1 line 3)* being specified in relation to respective time zones *(period of T_s, section 2 item 2 line 3)*, and in which a schedule for automatically changing the plurality of pieces of computer identification information is predefined *(section 2 item 2)*.

Regarding the limitation "a schedule definition division", Tang discloses a scheduler generating and storing assignments between client networks and assigned servers *(section 2.2 lines 1-2)*. Although not expressly mentioned, it is inherent in the storing operation for the scheduler to store the assignments in an accessible way in memory. Assignments stored in an accessible way in memory can be considered a data

structure, and this data structure subsequently fulfils the limitation of a schedule

definition division.

Hubis, King and Tang are analogous art in that they deal with managing the

connection relationship between clients accessing data from one of a plurality of storage

locations. It would have been obvious to someone with ordinary skill in the art to

schedule connections in Hubis and King's storage system with Tang's scheduler.

Tang discloses that using a scheduler allows user-specific data to be migrated or

located at a specific storage location *(section 1 paragraph 3 lines 11-13)* while still

keeping the load on each storage location balanced *(section 1 paragraph 3 lines 13-14)*.

Therefore, it would have been obvious to combine the storage system taught by

Hubis and King with the scheduler taught by Tang for the benefit of minimizing data

replication and balancing the load on each storage location, to obtain the invention as

specified in claim 8.

Claim Rejections - 35 USC ' 103 – Hubis and Reynolds

27.   **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over <u>Hubis</u> et

al *(US Patent Number 6,343,324)* and in view of <u>Reynolds</u> et al *("The Design and

Implementation of an Intrusion Tolerant System")*.

28.   As per **Claim 14**, <u>Hubis</u> discloses the input/output management method

according to Claim 10, including definition information *(NURAM data structures 182,

Figure 2A)* that defines whether said computer or each of a plurality of application

programs running in said computer can access a logical volume included in said disk

device or a logical area in a logical volume *(column 4 lines 6-8)*. Hubis does not

expressly disclose the definition information being automatically modified with a system

failure occurring in said connected computer as a trigger.

The limitation *"said computer or each of a plurality of application programs*

running in said computer" can be fulfilled by one or more of the limitations *"said*

computer" or *"each of a plurality of application programs running in said computer"*.

Reynolds discloses a system wherein a computer's access is automatically

modified with a system failure *(page 4 column 1 lines 7-11)* occurring in said connected

computer as a trigger *(page 4 column 1 lines 33-35)*.

Hubis and Reynolds are analogous art in that they both deal with the way clients

access servers. It would have been obvious to one with ordinary skill in the art to

combine Hubis' storage system with Reynolds failure detection system. Reynolds

discloses that fault tolerant techniques usually are designed to work against faults *(page*

1 column 2 lines 4-5). Reynolds also states that faults produce vulnerabilities that can

be exploited by an attacker *(page 1 column 2 lines 8-10)*.

Therefore, it would have been obvious to combine the storage system taught by

Hubis with the fault detection taught by Reynolds for the benefit of protection against

vulnerabilities, to obtain the invention as specified in claim 14.

Though not required for the current rejection, the Examiner notes that as per the

rejection of Claim 7, King *("Operating System Support for Virtual Machines")* discloses a

computer *(computer system, section 1 paragraph 1 lines 2-3)* including a plurality of

applications *(King, guest applications, figure "Type I VMM")*.

IX. CLOSING COMMENTS

a. STATUS OF CLAIMS IN THE APPLICATION

29.   The following is a summary of the treatment and status of all claims in the

application as recommended by M.P.E.P. ' 707.07(i):

a(1). CLAIMS REJECTED IN THE APPLICATION

30.   Per the instant office action, Claims 1-20 have received a first action on the

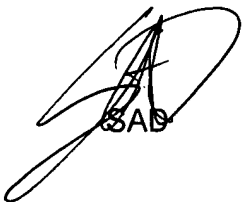merits and are subject of a first action non-final.

b. DIRECTION OF FUTURE CORRESPONDENCES

31.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Sam Dillon whose telephone number is 571-272-8010.

The examiner can normally be reached on 9:30-6:00.

32.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Sanjiv Shah can be reached on 571-272-4201. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

IMPORTANT NOTE

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sam Dillon
Examiner
Art Unit 2185

SANJIV SHAH
PRIMARY EXAMINER